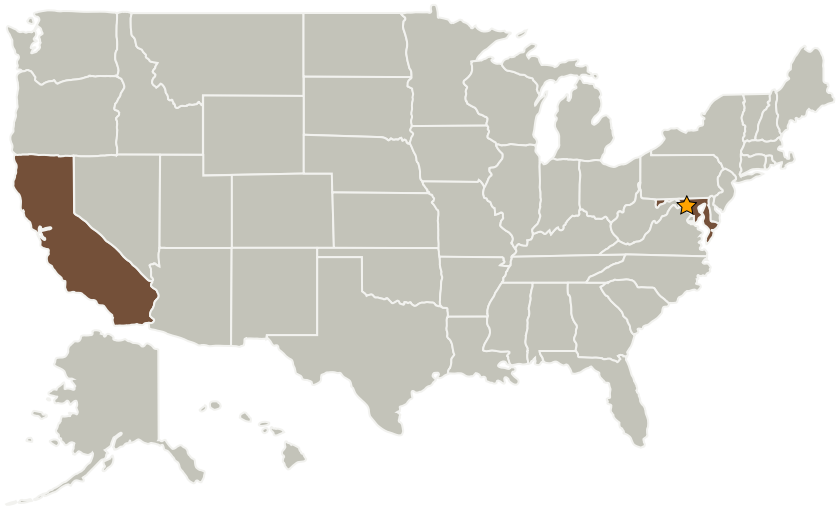
A Near-Infrared Photon Counting Camera for High Sensitivity Astronomical Observation, Phase I

Completed Technology Project (2007 - 2007)

Project Introduction

The innovation is a Near Infrared Photon-Counting Sensor (NIRPCS), an imaging device with sufficient sensitivity to capture the spectral signatures, in the wavelength range 0.9-1.7 um from very faint extra-solar targets and events with high resolution. The NIRPCS will have near zero read noise and dark rates below the read noise to support photon counting for frame capture times as high as 10 seconds. Up to 10E5 frames can be sequentially captured and digitally averaged. Important NASA applications for the NIRPCS include spectral measurements on extra-solar planets in search of water and bio-markers and measuring the dynamics of galaxies at high redshift to better understand the formation process. The technical objectives of Phase I in the development of the NIRPCS include i) determine which sensor components from an existing NIR sensor must be optimized to achieve NIR photon counting performance of frame capture times as lone as 10 seconds; and ii) create technical specifications for a NIRPCS prototype that would be developed under a Phase II SBIR program. The Work Plan has the following tasks: i) Review of improvement in photocathode QE and dark charge reduction; (ii) photocathode dark current modeling; and iii) prototype specification.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Intevac, Inc.	Supporting Organization	Industry	Santa Clara, California

Primary U.S. Work Locations	
California	Maryland

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes